I claim:

1. Apparatus for forging a body comprising an enclosure having a mold, forging material provided in the mold, and a forged product formed from the forging material in the mold at a predetermined temperature.

2. The apparatus of claim 1, wherein the enclosure is a heated enclosure having a chamber for housing the mold, a chamber heater, a ram heater and an anvil heater in the enclosure, a multiport coupled to the chamber for supplying material to the chamber, and a line coupled to the chamber for removing exhaust gases.

3. The apparatus of claim 2, wherein the multiport is an inlet/outlet multiport.

4. The apparatus of claim 2, wherein the line is a vacuum/vent line.

5. The apparatus of claim 2, wherein the forged product is a monocrystal, polycrystal or amorphous body.

6. The apparatus of claim 1, wherein the predetermined temperature ranges between about 400°C and about a melting point of the body.

7. The apparatus of claim 1, wherein the predetermined temperature is not greater than about 400°C.

8. The apparatus of claim 1, wherein the predetermined temperature is not greater than a melting point of a lowest melting phase in the body.

9. The apparatus of claim 5, wherein the body is forged at a temperature of about 400°C.

10. The apparatus of claim 5, wherein the body is forged at a temperature of about 600°C.

11. The apparatus of claim 5, wherein the body is forged at a temperature of about 800°C.

12. The apparatus of claim 5, wherein the body is of polycrystalline material.

13. The apparatus of claim 1, wherein the body is of amorphous material.

14. The apparatus of claim 5, wherein the body comprises single crystalline, polycrystalline and amorphous portions.

15. The apparatus of claim 2, wherein the product is formed in an atmosphere having a predetermined pressure in the chamber.

16. The apparatus of claim 15, wherein the atmosphere is selected from a group consisting of vacuum, reduced pressure, inert atmosphere, reactive atmosphere, and combinations thereof.

17. The apparatus of claim 15, wherein the atmosphere is reactive atmosphere

18. The apparatus of claim 17, wherein the reactive atmosphere is selected from a group consisting of plasma, reactive gases, solids, and combinations thereof.

19. The apparatus of claim 15, wherein the body is formed by purification of the forging material.

20. The apparatus of claim 1, wherein the forging material is a powder.

21. The apparatus of claim 20, wherein the powder comprises constituents selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, and combinations thereof.

22. The apparatus of claim 21, wherein the anvil has a temperature during forging between at least about room temperature and lower than a melting point of at least one of the constituents forming the crystal $R_T \leq T \leq T_M$.

23. The apparatus of claim 22, wherein the temperature is about $400°C \leq T \leq 800°C$.

24. The apparatus of claim 22, wherein the temperature is about $200°C \leq T \leq 1000°C$.

25. The apparatus of claim 22, wherein the temperature is about 200°C ≤ T ≤ 1200°C.

26. The apparatus of claim 22, wherein the temperature is not greater than about 200°C.

27. The apparatus of claim 26, wherein the temperature is not lesser than about 1200°C.

28. The apparatus of any of the preceding claims, wherein the body is forged in vacuum, reduced pressure or inert atmosphere having desired pressure.

29. The apparatus of any of the preceding claims, wherein the body is forged in vacuum, reduced pressure or reactive atmosphere having desired pressure.

30. The apparatus of claim 29, wherein the reactive atmosphere is selected from a group consisting of plasma, reactive gases, solids and combinations thereof and wherein a process of purification is administered.

31. The apparatus of any of the preceding claims, wherein the powder forged is silicon powder or shot having various grain sizes from sub-micron to large shot sizes of several millimeters or larger or the powder forged is silicon compound comprising at least one atom of silicon.

32. The apparatus of claim 31, wherein the powder forged is silicon powder and germanium powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

33. The apparatus of claim 31, wherein the powder forged is silicon powder and Si_xGe_{1-x} ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

34. The apparatus of claim 31, wherein the powder forged is silicon powder and silicon carbide, $Si_x(SiC)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

35. The apparatus of claim 31, wherein the powder

forged is silicon powder and silicon dioxide, $Si_x(SiO_2)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

36. The apparatus of claim 31, wherein the powder forged is silicon powder and metal, Si_xM_{1-x} ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

37. The apparatus of claim 31, wherein the powder forged is silicon powder and $Si_x(Alloy)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

38. The apparatus of claim 31, wherein the powder forged is silicon powder and/or metal and/or ceramic and/or alloy and/or oxide and/or any suitable additive powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

39. The apparatus of claim 2, wherein the forging apparatus comprises an anvil, a ram and a mold for forging the crystal.

40. The apparatus of claim 39, wherein each part in the enclosure is independently heated.

41. The apparatus of claim 39, wherein the enclosure is heated from all sides.

42. The apparatus of claim 39, wherein the enclosure is enclosed fully or partially in a vacuum, reduced pressure or desired pressure chamber, and wherein the chamber is filled with inert gas, reactive gas or plasma gas.

43. An extrusion apparatus for extruding a body, wherein the body has a temperature between 400°C and near melting point.

44. The apparatus of claim 43, wherein the temperature is less than 400°C or from 400°C to a melting point of a lowest melting phase in the body being extruded.

45. The apparats of claim 43, further comprising an

extrusion chamber for holding powder and forming an extruded body, further comprising a refill hopper for delivering material to be extruded from a material delivery assembly.

46. The apparatus of claim 45, further comprising a piston and a tube shaper for forcing the extruded body through the tube shaper.

47. The apparatus of claim 46, further comprising a surrounding chamber having a cooled wall and an internal heater, the chamber being coupled to a gas inlet/outlet multiport and a vacuum/vent line.

48. The apparatus of any of the preceding claims 43 to 47, wherein the body is extruded at a temperature of about 400°C.

49. The apparatus of any of the preceding claims 43 to 48, wherein the body is extruded at a temperature of about 600°C.

50. The apparatus of any of the preceding claims 43 to 49, wherein the body is extruded at a temperature of about 800°C.

51. The apparatus of any of the preceding claims 43 to 50, wherein the extruded body is monocrystal or polycrystalline material having at least one atom of silicon.

52. The apparatus of any of the preceding claims 43 to 51, wherein the extruded body is amorphous material having at least one atom of silicon.

53. The apparatus of any of the preceding claims 43 to 52, wherein the extruded body comprises single crystalline portion and polycrystalline portion and amorphous portion.

54. The apparatus of any of the preceding claims 43 to 53, wherein the extruding is in vacuum, reduced pressure or inert atmosphere having desired pressure.

55. The apparatus of any of the preceding claims 43 to 54, wherein the extruding is in vacuum, reduced pressure or reactive atmosphere having desired pressure.

56. The apparatus of any of the preceding claims 43 to

55, wherein the reactive atmosphere is plasma, reactive gases or solid and a process of purification is administered.

57. The apparatus of any of the preceding claims 43 to 56, wherein the extruding powder is selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves at temperature equal or greater than room temperature and lower than the melting point of one or more constituents of the pressed body $R_T \leq T \leq T_M$.

58. The apparatus of any of the preceding claims 43 to 57, wherein the temperature is about 400°C $\leq T \leq$ 800°C.

59. The apparatus of any of the preceding claims 43 to 58, wherein the temperature is about 200°C $\leq T \leq$ 1000°C.

60. The apparatus of any of the preceding claims 43 to 59, wherein the temperature is about 200°C $\leq T \leq$ 1200°C.

61. The apparatus of any of the preceding claims 43 to 60, wherein the temperature is smaller than 200°C or greater than 1200°C.

62. The apparatus of any of the preceding claims 43 to 61, wherein the extruding is in vacuum, reduced pressure or inert atmosphere having desired pressure.

63. The apparatus of any of the preceding claims 43 to 62, wherein the extruding is in vacuum, reduced pressure or reactive atmosphere having desired pressure.

64. The apparatus of any of the preceding claims 43 to 63, wherein the reactive atmosphere is plasma, reactive gases or solid and a process of purification is administered.

65. The apparatus of any of the preceding claims 43 to 64, wherein the powder is silicon powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger or silicon compound

comprising at least one atom of silicon.

66. The apparatus of any of the preceding claims 43 to 65, wherein the powder is silicon powder and germanium powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

67. The apparatus of any of the preceding claims 43 to 66, wherein the powder is silicon powder and Si_xGe_{1-x} ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

68. The apparatus of any of the preceding claims 43 to 67, wherein the powder is silicon powder and silicon carbide, $Si_x(SiC)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

69. The apparatus of any of the preceding claims 43 to 68, wherein the powder is silicon powder and silicon dioxide, $Si_x(SiO_2)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

70. The apparatus of any of the preceding claims 43 to 69, wherein the powder is silicon powder and metal, Si_xM_{1-x} ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

71. The apparatus of any of the preceding claims 43 to 70, wherein the powder is silicon powder and $Si_x(Alloy)_{1-x}$ ($0 \leq x \leq 1$) powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

72. The apparatus of any of the preceding claims 43 to 71, wherein the powder is silicon powder and/or metal and/or ceramic and/or alloy and or oxide and/or any suitable additive powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

73. The apparatus of any of the preceding claims 43 to 72, wherein the powder forged is silicon powder and/or metal and/or ceramic and/or alloy and/or oxide and/or any suitable additive powder or shot having various grain sizes from sub-micron to rather large shot sizes of several millimeters or larger.

74. The apparatus of any of the preceding claims 43 to 73, wherein the forging apparatus comprises an anvil, a ram and a mold for forging the crystal.

75. The apparatus of any of the preceding claims 43 to 74, wherein each part in the enclosure is independently heated.

76. The apparatus of any of the preceding claims 43 to 75, wherein the enclosure is heated from all sides.

77. The apparatus of any of the preceding claims 43 to 76, wherein the enclosure is enclosed fully or partially in a vacuum, reduced pressure or desired pressure chamber, and wherein the chamber is filled with inert gas, reactive gas or plasma gas.

78. Apparatus for plasma deposition comprising at least one substrate, material for deposition on the substrate, plasma generators or sources for the material, and a gas and a powder input system, wherein the substrate is a hollow tube or a solid body.

79. The apparatus of claim 78, wherein the substrate is one or a plurality of substrates and wherein plasma heated softened particles strike and stick to the substrate and form layers as the one or the plurality of substrates are rotated and/or translated.

80. The apparatus of claim 79, further comprising a chamber surrounding the deposition, wherein the substrate and/or the chamber are heated.

81. The apparatus of any of preceding claims 78 to 80, further comprising gas inlet/outlet multiport and vacuum/vent line coupled to the chamber.

82. The apparatus of any of preceding claims 78 to 81, further comprising one or more plasma generators or plasma sources, gas input system, powder input system, vacuum chamber, with or without one or more chamber heating elements, and the substrate with or without heating elements.

83. The apparatus of any of preceding claims 78 to 82, further comprising one or more deposition ports in the chamber.

84. The apparatus of any of preceding claims 78 to 83, wherein substrate has rotation and/or translation mechanisms.

85. The apparatus of any of preceding claims 78 to 84, wherein the chamber has rotation and/or translation mechanisms.

86. The apparatus of any of preceding claims 78 to 85, wherein the plasma assisted deposition of powder comprises powder selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves at temperature equal or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

87. The apparatus of any of preceding claims 78 to 86, wherein the powder is deposited under vacuum, reduced pressure, reactive atmosphere, inert gas, plasma, and any combinations thereof.

88. The apparatus of any of preceding claims 78 to 87, wherein the deposition is in inert atmosphere having desired pressure.

89. The apparatus of any of preceding claims 78 to 88, wherein the reactive atmosphere is plasma, reactive gases or solid and a process of purification is administered.

90. The apparatus of any of preceding claims 78 to 89, wherein a temperature in the chamber is between temperature equal to or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

91. The apparatus of any of preceding claims 78 to 90, wherein the temperature in the chamber is about 400°C ≤ T ≤ 800°C.

92. The apparatus of any of preceding claims 78 to 90, wherein the temperature in the chamber is about 200°C ≤ T ≤ 1000°C.

93. The apparatus of any of preceding claims 78 to 90, wherein the temperature in the chamber is about 200°C ≤ T ≤ 1200°C.

94. The apparatus of any of preceding claims 78 to 90, wherein the temperature is smaller than 200°C or greater than 1200°C.

95. The apparatus of any of preceding claims 78 to 90, wherein the temperature of the substrate is between temperature equal to or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

96. The apparatus of any of preceding claims 78 to 95, wherein the temperature of the substrate is about 400°C ≤ T ≤ 800°C.

97. The apparatus of any of preceding claims 78 to 95, wherein the temperature of the substrate is about 200°C ≤ T ≤ 1000°C.

98. The apparatus of any of preceding claims 78 to 95, wherein the temperature of the substrate is about 200°C ≤ T ≤ 1200°C.

99. The apparatus of any of preceding claims 78 to 95, wherein the temperature is smaller than 200°C or greater than 1200°C.

100. Deposition apparatus for spraying of powder, powder

and organic and/or inorganic base material, powder and gaseous material comprising a substrate, plurality of sprayers positioned to spray at least one portion of one side, and heating elements for heating the substrate at least from one side.

101. The apparatus of claim 100, wherein the substrate is rotated, and the substrate or slurry delivery tubes translate the sprayer, and wherein spray heated powder is heated and softened by heaters.

102. The apparatus of claim 101, wherein the powder is selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves at temperature equal to or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

103. The apparatus of any of preceding claims 100 to 102, wherein the substrate is tubular having any cross-section, planar, flat, curved or have any desired shape or form suitable for a particular application.

104. The apparatus of any of preceding claims 100 to 103, wherein the substrate comprises at least one element and wherein the substrate is rotated and translated.

105. The apparatus of any of preceding claims 100 to 104, wherein the substrate is heated from inside and/or outside, and wherein each substrate is independently heated.

106. The apparatus of any of preceding claims 100 to 105, wherein the sprayers are one or more sprayers and they are oscillated, rotated and translated in relation to themselves and to the substrate on which the deposition takes place, and wherein each sprayer delivers same or different

compounds for spraying of a premixed compound or provides for compound formation on a surface of the substrate.

107. The apparatus of any of preceding claims 100 to 106, wherein the apparatus is enclosed in vacuum, reduced pressure or any process suitable chamber that has vacuum and vent valves and gas delivery system.

108. The apparatus of any of preceding claims 100 to 107, wherein the deposition process is under vacuum, reduced pressure, reactive gas, inert gas, plasma, and any combinations thereof.

109. The apparatus of any of preceding claims 100 to 108, wherein the process is in inert atmosphere having desired pressure.

110. The apparatus of any of preceding claims 100 to 109, wherein the reactive atmosphere is plasma, reactive gases or solid, and wherein a process of purification is administered.

111. The apparatus of any of preceding claims 100 to 110, wherein a temperature in the chamber and a substrate temperature are between temperature equal to or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $RT \leq T \leq T_M$.

112. The apparatus of any of preceding claims 100 to 111, wherein the temperature in the chamber is about 400°C ≤ T ≤ 800°C.

113. The apparatus of any of preceding claims 100 to 111, wherein temperature in the chamber is about 200°C ≤ T ≤ 1000°C.

114. The apparatus of any of preceding claims 100 to 111, wherein temperature in the chamber is about 200°C ≤ T ≤ 1200°C.

115. The apparatus of any of preceding claims 100 to 111, wherein temperature in the chamber is smaller than 200°C or greater than 1200°C.

116. The apparatus of any of preceding claims 100 to

111, wherein temperature of the substrate is between temperature equal to or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

117. The apparatus of any of preceding claims 100 to 116, wherein temperature of the substrate is about 400°C ≤ T ≤ 800°C.

118. The apparatus of any of preceding claims 100 to 116, wherein temperature of the substrate is about 200°C ≤ T ≤ 1000°C.

119. The apparatus of any of preceding claims 100 to 116, wherein temperature of the substrate is about 200°C ≤ T ≤ 1200°C.

120. The apparatus of any of preceding claims 100 to 116, wherein temperature of the substrate is smaller than 200°C or greater than 1200°C.

121. Apparatus for making tubular members having any cross section, any length and any desired shape or form comprising a body within or without a mold, a heater covering part of the mold and a chamber fully or partially surrounding at least one member and heating elements.

122. The apparatus of claim 121, wherein the chamber has a gas inlet/outlet multiport and a vacuum/vent line.

123. The apparatus of claim 122, further comprising a silicon or a silicon containing compound preform placed in the heated chamber.

124. The apparatus of claim 123, wherein the preform is rotated and a heated ring is translated along the preform for sintering or melting the material and forming a solid product.

125. The apparatus of any of preceding claims 121 to 124, wherein the chamber is a vacuum, low pressure or pressure chamber.

126. The apparatus of any of preceding claims 121 to 125, wherein the chamber surrounding the member and the

heating elements is absent.

127. The apparatus of any of preceding claims 121 to 126, wherein the member is rotated and/or translated.

128. The apparatus of any of preceding claims 121 to 127, wherein the member is heated from inside and/or outside.

129. The apparatus of any of preceding claims 121 to 128, wherein the member is heated from outside by chamber heaters and a zone heater for directional or non-directional processing.

130. The apparatus of any of preceding claims 121 to 129, wherein the chamber has vacuum and/or vent valves.

131. The apparatus of any of preceding claims 121 to 130, wherein the chamber has a gas inlet/outlet multiport.

132. The apparatus of any of preceding claims 121 to 131, wherein the chamber has one or more plasma source attached.

133. The apparatus of any of preceding claims 121 to 132, wherein the material processed is solid material, powder, powder and organic or inorganic base material, powder and gaseous material.

134. The apparatus of any of preceding claims 121 to 133, wherein the powder is selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves at temperature equal or greater than room temperature and lower than the melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

135. The apparatus of any of preceding claims 121 to 134, further comprising at least one substrate, plurality of sprayers positioned to spray at least one portion of one side, and heating elements for heating the substrate at least

from one side.

136. The apparatus of any of preceding claims 121 to 135, wherein the substrate is tubular having any cross-section, planar or have any desired shape or form suitable for a particular application.

137. The apparatus of any of preceding claims 121 to 136, wherein processing of the material is under vacuum, reduced pressure, reactive gas, inert gas, plasma, and any combinations thereof.

138. The apparatus of any of preceding claims 121 to 137, wherein processing of the material is in inert atmosphere having desired pressure.

139. The apparatus of any of preceding claims 121 to 138, wherein the reactive atmosphere is plasma, reactive gases or solid, and wherein a process of purification is administered.

140. The apparatus of any of preceding claims 121 to 139, wherein the process temperature is between temperature equal to or greater than room temperature and lower than a melting point of one or more constituents of the deposited body $R_T \leq T \leq T_M$.

141. The apparatus of any of preceding claims 121 to 140, wherein the process temperature is about 400°C $\leq$ T $\leq$ 800°C.

142. The apparatus of any of preceding claims 121 to 140, wherein the process temperature is about 200°C $\leq$ T $\leq$ 1000°C.

143. The apparatus of any of preceding claims 121 to 140, wherein the process temperature is about 200°C $\leq$ T $\leq$ 1200°C. The temperature is smaller than 200°C or greater than 1200°C.

144. The apparatus of any of preceding claims 121 to 143, wherein the temperature of the substrate is between temperature equal or greater than room temperature and lower than the melting point of one or more constituents of the

deposited body $R_T \leq T \leq T_M$.

145. The apparatus of any of preceding claims 121 to 144, wherein the temperature of the substrate is about 400°C ≤ T ≤ 800°C.

146. The apparatus of any of preceding claims 121 to 144, wherein the temperature of the substrate is about 200°C ≤ T ≤ 1000°C.

147. The apparatus of any of preceding claims 121 to 144, wherein the temperature of the substrate is about 200°C ≤ T ≤ 1200°C.

148. The apparatus of any of preceding claims 121 to 144, wherein the temperature is smaller than 200°C or greater than 1200°C.

149. The apparatus of any of preceding claims 121 to 148, wherein the member is tubular and has any cross section such as round, elliptical, rectangular, polygonal or any other shape.

150. The apparatus of any of preceding claims 121 to 149, wherein the member has uneven thickness pattern over its entire surface.

151. The apparatus of any of preceding claims 121 to 150, wherein the member has different composition and density over the entire body.

152. The apparatus of any of preceding claims 121 to 151, wherein the member has different composition and density over its thickness.

153. The apparatus of any of preceding claims 121 to 152, wherein the composition and material properties is layered over any dimension of the member such as length, thickness, width, radius, etc.

154. A preform comprising a horizontal or vertical wafer processing boat preform comprising a plurality of protrusions for fabrication of slots for wafers and openings for gas flow between the wafers to enable deposition of even thickness.

155. The preform of claim 154, wherein the wafer boat

preform is made of material selected from a group consisting of silicon, silicon compound comprising at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

156. The preform of claim 154, wherein the wafer boat preform is made by layering one or more of the following materials: Si, silicon compound comprising at least one silicon atom, Si_xGe_{1-x}, SiC, $Si_x(SiC)_{1-x}$, $Si_x(SiO_2)_{1-x}$, $Si_x(Oxide)_{1-x}$, Si_xM_{1-x}, composite material, and any combination or order between themselves, wherein $0 \leq x \leq 1$.

157. The preform of any of preceding claims 154 to 156, wherein the wafer boat preform has closed ends at a base and a top that are half or full discs and end discs having outer diameters equal or greater than an outer diameter of the wafer boat.

158. The preform of any of preceding claims 154 to 157, wherein the end discs are solid discs.

159. The preform of any of preceding claims 154 to 158, wherein the end discs have certain portions removed.

160. The preform of any of preceding claims 154 to 159, wherein the wafer boat preform is fabricated from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide Six(Oxide)1-x, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

161. The preform of any of preceding claims 154 to 160, wherein the wafer boat preform is fabricated by heating and

melting or sintering a boat fabrication material using a mold or prefabricated using a mold having desired shape and form, or transferring it to the mold, solidifying it, cooling it down at a desired cool-down regime, machining it to a desired tolerance, and sintering it using process defined parameters.

162. The preform of any of preceding claims 154 to 161, wherein the boat fabrication material is powder mixed with organic and/or inorganic compounds for shaping purposes.

163. The preform of any of preceding claims 154 to 161, wherein the boat fabrication material is solid material.

164. The preform of any of preceding claims 154 to 163, wherein the melting or sintering is done in a vacuum chamber.

165. The preform of any of preceding claims 154 to 164, wherein the melting or sintering is done under reduced or high pressure of inert or reactive gas.

166. The preform of any of preceding claims 154 to 165, wherein the reactive gas is mixture between atomic or charged molecular state gas such as plasma gas and a neutral inert or reactive gas.

167. The preform of any of preceding claims 154 to 167, wherein the melting or sintering is preceded by one or more steps of purging and purification.

168. Wafer boat preform comprising boat fabrication material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

169. The wafer boat preform of claim 168, wherein the boat is made by pressing the boat fabrication material within a die having desired shape and form, sintering, cooling it down at a desired cool-down regime, and machining it to a

desired tolerance.

170. The wafer boat preform of claim 169, wherein the boat fabrication material is powder mixed with organic and/or inorganic compounds for shaping purposes.

171. The wafer boat preform of claim 169, wherein the boat fabrication material is solid material.

172. The wafer boat preform of any of preceding claims 168 to 171, wherein the pressing is done in a vacuum chamber.

173. The wafer boat preform of any of preceding claims 168 to 171, wherein the pressing is done under reduced or high pressure of inert or reactive gas.

174. The wafer boat preform of any of preceding claims 168 to 173, wherein the reactive gas is mixture between atomic or charged molecular state gas such as plasma gas and a neutral inert or reactive gas.

175. The wafer boat preform of any of preceding claims 168 to 174, wherein the melting or sintering is preceded by one or more steps of purging and purification.

176. A process for fabrication of wafer boat preforms consisting of providing a boat fabrication material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

177. The process of claim 176, further comprising extruding the fabrication material within a die having desired shape and form, sintering, cooling it down at a desired cool-down regime, and machining it to a desired tolerance.

178. The process of claim 177, wherein the boat fabrication material is powder.

179. The process of claim 178, wherein the boat fabrication material is powder mixed with organic or inorganic materials.

180. The process of claim 178, wherein the boat fabrication material is solid material.

181. The process of any of preceding claims 176 to 180, wherein the pressing is done in a vacuum chamber.

182. The process of any of preceding claims 176 to 181, wherein the pressing is done under reduced or high pressure of inert or reactive gas.

183. The process of any of preceding claims 176 to 182, wherein the reactive gas is a mixture between atomic or charged molecular state gas such as plasma gas and a neutral inert or reactive gas.

184. The process of any of preceding claims 176 to 183, wherein the melting or sintering is preceded by one or more steps of purging and purification.

185. Process for fabrication of a member having shape of tube, plate, rod or any other shape or form consisting of providing a material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

186. The process of claim 185, further comprising heating and melting or sintering the material made with a mold having desired shape and form, or transferring the material to the mold, solidifying it, cooling it down at a desired cool-down regime, removing the mold, machining it to the desired tolerance, and sintering again.

187. The process of claim 186, wherein the material is powder mixed with organic or inorganic materials.

188. The process of claim 186, wherein the material is solid material.

189. The process of any of preceding claims 185 to 188, wherein the melting is done in a vacuum chamber.

190. The process of any of preceding claims 185 to 188, wherein the melting or sintering is done under reduced or high pressure of inert or reactive gas.

191. The process of any of preceding claims 185 to 190, wherein the reactive gas is a mixture between atomic or charged molecular state gas such as plasma gas and a neutral inert or reactive gas.

192. The process of any of preceding claims 185 to 191, wherein the melting or sintering is preceded by one or more steps of purging and purification.

193. The process of any of preceding claims 185 to 192, further comprising fabricating wafer boat members having shape of tube, plate, rod or any other shape.

194. The process of any of preceding claims 185 to 193, further comprising cutting the member or solidified boat in two along medial lines, forming openings in cylindrical walls, coating and fusing depositing material on top of base material.

195. The process of any of preceding claims 185 to 194, further comprising forming two boats by melting or molding or casting or hot pressing and sintering the powder material.

196. The process of any of preceding claims 185 to 195, further comprising forming slots in inward and/or outward ribs or extensions, forming ends of the boats having complementary steps to connect the boats end-to-end in an axial stack or row.

197. Fabrication process comprising the steps of providing with a powder or solid, heating the powder or the solid to a plastic slate and forming a tube, plate or rod.

198. The process of claim 197, further comprising forming a chamber liner and applying to a process chamber,

forming a chemical vapor deposition (CVD) station, halving formed tubes lengthwise, cutting windows, inward ribs or extensions in the tubes, or the inner walls are slotted, forming a vertical boat, and in parallel steps cutting windows, plotting the boat and forming a horizontal boat.

199. The process of claim 198, wherein the powder is mixed with organic or inorganic material.

200. The process of claim 198, wherein the powder is selected from a group consisting of silicon, silicon compound containing at least one atom of silicon, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

201. Wafer processing apparatus comprising a processing chamber, wafer handling tools, wafer boat handling tools consisting of one or more processing chambers, shields and enclosures employing one or more members, and at least one member made of material containing at least one atom of silicon.

202. The apparatus of claim 201, wherein the at least one member is of material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

203. the apparatus of claim 202, wherein each chamber comprises separate or a common gas delivery and venting system, vacuum system, internal or external heating elements, and cooled or not cooled vacuum shell.

204. The apparatus of claim 203, wherein the vacuum shell is partially or fully lined with material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

205. Wafer processing apparatus comprising plural processing chambers, wherein at least one of the processing chambers is a chemical vapor deposition (CVD) chamber comprising one or more members consisting of material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

206. The apparatus of claim 205, wherein each CVD chamber comprises separate or common gas delivery and venting system, vacuum system, internal or external heating elements, and cooled or not cooled vacuum shell.

207. The apparatus of claim 206, wherein the vacuum shell is partially or fully lined with material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x$

≤1.

208. Wafer processing apparatus comprising plural processing chambers, wherein at least one of the processing chambers is an epitaxial chamber comprising one or more members consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

209. The apparatus of claim 208, wherein each epitaxial chamber comprises separate or common gas delivery and venting system, vacuum system, internal or external heating elements, and cooled or not cooled vacuum shell.

210. The apparatus of claim 209, wherein the vacuum shell is partially or fully lined with material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

211. Wafer processing apparatus comprising plural processing chambers, wherein at least one of the processing chambers is a thin film deposition chamber comprising one or more members made of material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x},

Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

212. The apparatus of claim 211, wherein the thin film deposition chamber comprises separate or common gas delivery and venting system, vacuum system, internal or external heating elements, cooled or not cooled vacuum shell.

213. The apparatus of claim 212, wherein the vacuum shell is partially or fully lined with material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein all cases $0 \leq x \leq 1$.

214. Wafer processing apparatus comprising plural processing chambers, wherein at least one of the processing chambers is thin film removal chamber comprising one or more members consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si$_x$Ge1-x solid solution, silicon and Silicon Carbide Si$_x$(SiC)1-x, Silicon and silicon dioxide Si$_x$(SiO2)1-x, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein all cases $0 \leq x \leq 1$.

215. The apparatus of claim 214, wherein the thin film removal chamber comprises separate or common gas delivery and venting system, vacuum system, internal or external heating elements, cooled or not cooled vacuum shell partially or fully lined with silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and

silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

216. The apparatus of any of the preceding claims 201 to 215, wherein one of the chambers is a main chamber connected with other chambers directly or via one or more gate valves.

217. The apparatus of any of the preceding claims 201 to 216, wherein one or more chambers is vacuum, low pressure or desired pressure chamber.

218. The apparatus of any of the preceding claims 201 to 217, wherein one or more chambers has at least one internal or external heater.

219. The apparatus of any of the preceding claims 201 to 218, wherein one or more chambers has at least one partial or complete heat shield.

220. A chemical vapor deposition (CVD) system comprising a vacuum vessel with cooled or not cooled chamber with single or double wall, a robot handling arm having elements for wafer or wafer boat delivery/removal that forms a vacuum tight seal when the chamber is loaded, a wafer tray/boat containing one or more wafers resting on the wafer boat delivery/removal arm, a shield surrounding the wafer tray/boat and an inside portion of the wafer handling arm, process gas delivery system with all respective valves attached to the chamber and having a delivery tube extending into a wafer area, inert gas delivery system with all respective valves attached to the chamber and having a delivery tube with or without diffuser extending into the wafer area, vacuum pumping system connected to the chamber, and an inside or outside heater directing heat into the process area.

221. The system of claim 220, wherein the process area comprises one or more members of material selected from a

group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

222. The system of claim 221, wherein the CVD system is vertical, horizontal or of any suitable position from -90° to +90°.

223. The system of any of the preceding claims 220 to 222, wherein the wafer boat is of solid connected members made from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

224. The system of any of the preceding claims 220 to 222, wherein the wafer boat is of modular elements made from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

225. The system of any of the preceding claims 220 to 224, wherein the wafer boat comprises one or more slots for supporting wafers spaced at appropriate distances.

226. The system of any of the preceding claims 220 to

225, wherein the wafers in the boat are positioned so there is no other material between the wafers other than vacuum or any gas present in a processing part of the chamber.

227. The system of any of the preceding claims 220 to 226, wherein the wafer boats comprise slots for wafer support and susceptors between the wafers for improved temperature distribution over wafer surfaces resulting in more uniform deposited layer thickness and composition.

228. The system of any of the preceding claims 220 to 227, wherein the susceptor in the boat is part of the wafer boat.

229. The system of any of the preceding claims 220 to 227, wherein the susceptor in the boat is inserted after or prior to the boat being made, or together with the wafer loading.

230. The system of any of the preceding claims 220 to 229, wherein the boat is modular.

231. The system of any of the preceding claims 220 to 230, wherein each module of the boat comprises support for one or more wafers.

232. The system of any of the preceding claims 220 to 231, wherein each module comprises support for one or more wafers separated by inserted or built in susceptors.

233. The system of any of the preceding claims 220 to 232, wherein the susceptors are full body or have cuts to allow wafer only insertion/removal handling.

234. The system of any of the preceding claims 220 to 233, wherein the boat is made from modular parts connected via chemical or mechanical bonding.

235. The system of any of the preceding claims 220 to 234, wherein the boat has round, elliptical, polygonal or any other cross section.

236. The system of any of the preceding claims 220 to 235, wherein the boat has one or more elements at each end for mechanical strength during handling.

237. The system of any of the preceding claims 220 to 236, wherein end parts of the boat are modules.

238. The system of any of the preceding claims 220 to 237, wherein all parts of the boat are made from same or different materials.

239. A single wafer processing system for chemical vapor deposition (CVD), epitaxial deposition, thin film deposition/removal or any other wafer processing for chips comprising a vacuum vessel with cooled or not cooled chamber wall and with single or double wall, connected directly or through at least one gate valve to a chamber with multistage wafer handling mechanism for wafer delivery/removal, a shield surrounding the wafer processing area, process and inert gas delivery system with all respective valves attached to the chamber, a delivery tube extending into a wafer area, vacuum pumping system connected to the chamber, inside and/or outside heater directing heat into the process area.

240. The system of claim 239, wherein the process area comprises one or more members consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

241. The system of claim 240, further comprising vacuum pumping systems and gas delivery systems for both chambers.

242. The system of claim 241, further comprising heating elements located around or in the chambers.

243. The system of claim 242, further comprising chamber connection ports connecting a chamber to additional chambers for transferring or removing the wafers.

244. The system of any of the preceding claims 239 to 243, wherein the process chamber is a CVD chamber.

245. The system of any of the preceding claims 239 to 243, wherein the process chamber is an epitaxial deposition chamber.

246. The system of any of the preceding claims 239 to 243, wherein the process chamber is a thin film deposition/removal chamber.

247. The system of any of the preceding claims 239 to 243, wherein the process chamber is a wafer process chamber.

248. The system of any of the preceding claims 239 to 247, wherein the process chamber has any cross section and height.

249. The system of any of the preceding claims 239 to 248, wherein the system is vertical, horizontal or has any suitable position from -90° to +90°.

250. The system of any of the preceding claims 239 to 249, wherein the members are made from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

251. The system of any of the preceding claims 239 to 250, wherein the members are solidly connected by chemical or mechanical bonding.

252. The system of any of the preceding claims 239 to 251, wherein the members are made of material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between

themselves, or made from composite material, wherein $0 \leq x \leq 1$, and wherein the members are modular.

253. The system of any of the preceding claims 239 to 251, wherein the members are made of material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and Silicon Carbide $Si_x(SiC)_{1-x}$, Silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$, and comprise one or more slots for wafers' support to optimize the process.

254. The system of any of the preceding claims 239 to 253, wherein the wafer processing chamber has a susceptor next to the wafer for improved temperature distribution over the wafer surface that results in more uniform deposited layer thickness and composition.

255. The system of any of the preceding claims 239 to 254, wherein the susceptor in the process chamber is part of the chamber.

256. The system of any of the preceding claims 239 to 255, further comprising a wafer delivery arm, wherein the wafer delivery arm is made in full or partially from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

257. The system of any of the preceding claims 239 to 256, wherein the susceptor is a full body or has certain cuts to allow wafer only insertion/removal handling.

258. The system of any of the preceding claims 239 to 257, wherein all chamber parts are made in full or partially from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$, and are from modular parts connected via chemical or mechanical bonding or by assembling without bonding.

259. The system of any of the preceding claims 239 to 258, wherein the chamber has round, elliptical, polygonal or any other applicable cross section.

260. The system of any of the preceding claims 239 to 259, further comprising end parts of the wafer processing chamber, wherein the end parts are modules.

261. The system of any of the preceding claims 239 to 260, wherein all parts of the boat are made from the same or different materials.

262. Epitaxial/CVD chamber body comprising epitaxial/CVD chambers made in full or partially from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

263. The chamber body of claim 262, further comprising bodies, an optical window for wafer radiation and at least one opening for wafer and gas delivery/removal.

264. The chamber body of claim 263, wherein the bodies

are bonded together along side edges forming the chamber, a wafer heater accesses wafers in the chamber through the window, and a wafer lifting and rotating mechanism port and assembly supports wafers through an opposite window.

265. The chamber body of any of the preceding claims 262 to 264, wherein the chambers have suitable wall thicknesses and at least one infrared window at each side, hollow interior and at least one gate opening for connection to a wafer supply and process gas supply chamber and a gas exhaust.

266. The chamber body of any of the preceding claims 262 to 265, wherein the chamber is made from materials selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

267. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber body comprises a single body made by pressing of material, machining it from inside and out in its green state, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

268. The chamber body of claim 267, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

269. The chamber body of any of the preceding claims 262

to 266, wherein the epitaxial chamber body comprises a single body made by casting of the material, machining it from inside and out in its green state, purifying said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

270. The chamber body of claim 269, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

271. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises upper and lower parts made by casting to shape the material, machining the parts, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

272. The chamber body of claim 271, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

273. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises single part or upper and lower parts made by casting or cold or hot pressing to shape to shape the material, machining the parts, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at

appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

274. The chamber body of claim 273, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

275. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises one part or upper and lower parts made by cold or hot pressing of a block of the material, machining the chamber, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

276. The chamber body of claim 275, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

277. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises one part or upper and lower parts made by cold or hot extrusion of a block or a desired shape of the material, machining the chamber, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the

specifications of the epitaxial deposition process.

278. The chamber body of claims 277, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

279. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises one part or upper and lower parts made by plasma spraying of the material, and forming a chamber to a desired shape, machining the chamber, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

280. The chamber body of claim 279, wherein the finished body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

281. The chamber body of any of the preceding claims 262 to 266, wherein the epitaxial chamber comprises one part or upper and lower parts made by spraying of organic or inorganic based slurry of the material and forming a chamber to a desired shape, machining the chamber, purifying the said body at a certain temperature by immersing it in a chemically reactive gas, plasma or liquid for certain period of time, sintering the said body at appropriate temperature determined by its composition, joining the parts by chemical and/or mechanical means, final machining of the said body, if needed, to meet the specifications of the epitaxial deposition process.

282. The chamber body of claim 281, wherein the finished

body is subjected to thin film deposition such as chemical vapor deposition, plasma enhanced deposition, or other suitable deposition method for better finish on the inside and outside.

283. The chamber body of any of the preceding claims 262 to 282, wherein the chamber comprises two separate halves joined at one plane followed by final machining.

284. The chamber body of any of the preceding claims 262 to 282, wherein the chamber comprises a single body machined from a solid block material.

285. The chamber body of any of the preceding claims 262 to 282, wherein the chamber comprises a single body made by method of plasma spraying followed by final machining.

286. The chamber body of any of the preceding claims 262 to 282, wherein the chamber comprises a single body made by method of slurry spraying.

287. The chamber body of any of the preceding claims 262 to 282, wherein the chamber comprises a single body machined by method of casting, forging or extrusion followed by sintering and final machining.

288. The chamber body of any of the preceding claims 262 to 287, wherein the chamber has a vacuum, reduced pressure or desired pressure chamber.

289. The chamber body of any of the preceding claims 262 to 288, wherein the chamber has a liner for a vacuum, reduced pressure or desired pressure chamber for wafer processing applications.

290. The chamber body of any of the preceding claims 262 to 289, wherein the chamber is made of modular pieces stacked on top of each other or bonded by mechanical or chemical means.

291. The chamber body of any of the preceding claims 262 to 290, further comprising an optical window, wherein the optical window is from same or suitable material stacked on the chamber or bonded by mechanical or chemical means.

292. The chamber body of any of the preceding claims 262 to 291, wherein the chamber has one or more optical windows depending on the process requirements.

293. The chamber body of any of the preceding claims 262 to 292, further comprising a gas delivery system for delivering process and inert gases into the chamber attached to the chamber or to the chamber wall.

294. The chamber body of any of the preceding claims 262 to 293, further comprising gas delivery members exposed to the process atmosphere made from the chamber material or chamber lining material.

295. The chamber body of any of the preceding claims 262 to 294, further comprising a wafer delivering/removing arm to/from the chamber made from the chamber material or chamber lining material.

296. The chamber body of any of the preceding claims 262 to 295, further comprising a susceptor and a member that either holds the wafer or surrounds the wafer from the sides, the top or the bottom, as required by the process made from the chamber material or chamber lining material.

297. The chamber body of any of the preceding claims 262 to 296, further comprising a reduced pressure chamber surrounding the epitaxial /CVD chamber made in full or partially from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$.

298. The chamber body of any of the preceding claims 262 to 297, further comprising a body, an optical window for wafer radiation and at least one opening for wafer and gas delivery/removal.

299. The chamber body of any of the preceding claims 262 to 298, further comprising an outer chamber of vacuum, reduced pressure or desired pressure as required by the process.

300. The chamber body of any of the preceding claims 262 to 299, wherein the chamber comprises one or more optical windows depending on the process requirements.

301. The chamber body of any of the preceding claims 262 to 300, wherein the chamber has gas delivery system for delivering process and inert gases into the chamber attached to the chamber or to the chamber wall.

302. A single wafer processing system for CVD, epitaxial deposition, thin film deposition/removal or any other wafer processing for a chip comprising a vacuum vessel with cooled or not cooled chamber wall with single or double wall, connected directly or through at least one gate valve to a chamber with multistage wafer handling mechanism for wafer delivery/removal, a shield surrounding the wafer processing area, process and inert gas delivery system with all respective valves attached to the chamber and having a delivery tube extending into a wafer area, vacuum pumping system connected to the chamber, inside and/or outside heater directing heat into the process area employing one or more members made from material selected from a group consisting of silicon, silicon compound comprising at least one silicon atom, silicon and germanium, Si_xGe_{1-x} solid solution, silicon and silicon carbide $Si_x(SiC)_{1-x}$, silicon and silicon dioxide $Si_x(SiO_2)_{1-x}$, silicon and any ceramic, silicon and any oxide $Si_x(Oxide)_{1-x}$, silicon and any metal Si_xM_{1-x}, Silicon and any alloy Si_xA_{1-x}, any combination between themselves, or made from composite material, wherein $0 \leq x \leq 1$, employing at least one epitaxial chamber.

303. Process for fabrication of silicon/silicon alloy/composite/silicon compound having at least one silicon atom members comprising processing high purity quartz or

fused silica material and forming different structures for processing wafers.

304. The process of claim 303, wherein the forming further comprises making silicon boats having desired mechanical properties.

305. The process of claim 304, wherein the processing comprises forging, extrusion, plasma and hot substrate powder deposition, slurry spray and slurry casting, silicon/silicon alloy/composite/silicon compound having at least one silicon atom casting and directional solidification for the fabrication of the members.

306. The process of any of the preceding claims 303 to 305, wherein the processing comprises silicon/silicon alloy/composite/silicon compound having at least one silicon atom powder pressing and/or forging and extrusion.

307. The process of any of the preceding claims 303 to 306, wherein the forming comprises fabrication of epitaxial reactors, chemical vapor deposition (CVD) chambers, CVD chamber liners, tubing, and combinations thereof.

308. The process of any of the preceding claims 303 to 306, wherein the forming comprises fabrication of silicon/silicon alloy/composite/silicon compound having at least one silicon atom members selected from a group consisting of wafer boats for horizontal and vertical wafer processing furnaces and deposition chambers, epitaxial reactors, lining for CVD chambers, epitaxial reactors and other wafer processing tools, tubing having any form or cross section shape, and combinations thereof.

309. The process of any of preceding claims 303 to 308, wherein the processing comprises pressing silicon/silicon alloy/composite/silicon compound having at least one silicon atom material at room temperature or at an elevated temperature in vacuum or in a controlled atmosphere, outgassing, removing oxygen, nitrogen, water vapor and other undesired gases before/during/after pressing of the material.

310. The process of any of the preceding claims 303 to 309, wherein the pressing comprises pressing to a near shape of a part being fabricated.

311. The process of any of the preceding claims 303 to 309, wherein the pressing comprises pressing into a raw material for further processing into desired members.

312. The process of any of the preceding claims 303 to 311, wherein the material comprises a powder selected from a group consisting of silicon, silicon compound having at least one silicon atom, silicon and germanium, silicon and metal, silicon and silicon carbide, silicon and ceramic, silicon and a suitable element or compound and combinations thereof.

313. The process of any of the preceding claims 303 to 312, wherein processing the material comprises providing silicon powder, silicon compounds having at least one atom of silicon, silicon based alloys or composites having a desired grain size in a pressing chamber.

314. The process of any of the preceding claims 303 to 313, wherein the processing further comprises treating with gas treatment and/or vacuuming the residual gas and then pressing the material.

315. The process of any of the preceding claims 303 to 314, wherein the processing comprises pressing at a temperature as low as room temperature or as high as a softening point of the lowest melting point constituent.

316. The process of any of the preceding claims 303 to 315, wherein the processing further comprises sintering the pressed part in vacuum or in appropriate gaseous atmosphere and fabricating very dense materials with predetermined hardness.

317. The process of claim 316, further comprising tailoring various parts for various applications by adjusting a grain size of the material, wherein smaller grain sizes are used for making parts with higher fracture strength and vice-versa.

318. The process of any of the preceding claims 303 to 317, further comprising machining the parts made before the sintering, sintering, and after the sintering allowing the parts to yield near shape for using as sintered parts or for subjecting sintered parts to a further final machining.

319. The process of any of the preceding claims 303 to 318, wherein the processing comprises processing at pressures of up to 800,000 psi or higher.

320. The process of any of the preceding claims 303 to 319, wherein the processing comprises processing at temperatures of suitable for the material during pressing and sintering and varying the temperatures corresponding to a composition of the material.

321. The process of any of the preceding claims 303 to 320, wherein the processing comprises processing at temperatures between 300°C and 1350°C.

322. The process of any of the preceding claims 303 to 320, wherein the processing comprises processing at temperatures up to about 300°C and greater than about 1350°C corresponding to the material being processed and desired properties of the members.

323. The process of any of the preceding claims 303 to 322, wherein the forming comprises press-shaping solid silicon of single crystal or polycrystalline material into various parts, heating the silicon to a desired temperature and obtaining appropriate plastic properties.

324. The process of claim 323, wherein the press-shaping comprises shaping by forging or extrusion of the silicon/silicon alloy/composite/silicon compound having at least one silicon atom material.

325. The process of claims 303 and 324, wherein the pressing and shaping of the material is done before, during or after sintering of the material.

326. The process of any of the preceding claims 303 to 325, further comprising selecting a desired material

corresponding to a plasticity of the material for determining grain size and fracture strength.

327. The process of any of the preceding claims 303 to 326, wherein the pressing comprises several steps of hot pressing the material.

328. The process of any of the preceding claims 303 to 327, wherein the processing comprises extrusion followed by forging and/or high pressure annealing.

329. The process of any of the preceding claims 303 to 305, wherein the shaping of the material further comprises imbedding stronger material in the part being made for reinforcement purposes.

330. The process of claim 329, wherein the imbedding comprises providing a strong layer within the part or forming the stronger layer on an outer or inner surface of the part and fabricating parts having desired strength pattern.

331. Member forming process comprising providing plasma heated or not heated silicon powder material or non plasma heated or non-heated silicon powder material, introducing the material into a chamber, directing the material towards a heated substrate and depositing on the substrate.

332. The process of claim 331, wherein the chamber is a vacuum, low pressure, normal pressure or high-pressure chamber.

333. The process of claim 332, wherein the powder deposition comprises depositing silicon only, or silicon and other material particles and reinforcing silicon structure without changing chemical behavior or material particles that change the properties of silicon and forming a silicon alloy or solid solution.

334. The process of any of the preceding claims 331 to 333, wherein the material is selected from a group consisting of Ge, Si_xG_{1-x}, SiC, silicon based materials, silicon compound having at least one silicon atom, ceramics, suitable elements or compounds and doping and/or reinforcing the material.

335. The process of any of the preceding claims 331 to 334, wherein the depositing comprises depositing layers corresponding to a temperature of the substrate, wherein the deposited layers have different densities and thicknesses, sintering the layers and forming very dense material having desired fracture strengths.

336. The process of any of the preceding claims 331 to 335, further comprising injecting the non-plasma heated powder or not heated powder material in the chamber and directing towards a hot substrate within a heated or non-heated controlled atmosphere or vacuum chamber.

337. The process of any of the preceding claims 331 to 336, further comprising heating the powder material to a desired temperature on its way to and from the substrate, adhering grains of the material to the substrate and/or other previously deposited grains on the substrate and forming a deposited body.

338. The process of any of the preceding claims 331 to 337, wherein a density of the deposited body is proportional to grain size, grain temperature at impact and substrate temperature.

339. The process of any of the preceding claims 331 to 338, wherein the member is a silicon/silicon alloy/composite/silicon compound having at least one silicon atom member having shapes selected from a group consisting of rod, tube having any cross-section and shape, any chamber looking type shape with one or more gates, and combinations thereof.

340. The process of any of the preceding claims 331 to 339, wherein the substrate is heated up to a softening point of silicon material.

341. The process of any of the preceding claims 331 to 340, wherein an optimal temperature is between about 800°C to about 1350°C.

342. The process of any of the preceding claims 331 to

341, wherein the temperatures are less than about 800°C and more than about 1350°C.

343. The process of any of the preceding claims 331 to 342, wherein the sintering of the silicon/silicon alloy/composite/silicon compound having at least one silicon atom members is done in situ, or after machining, shaping or joining of the members with other parts made by the same or different process.

344. The process of any of the preceding claims 331 to 343, wherein the sintering temperature corresponds to chemical composition of the parts and their applications.

345. Chemical vapor deposition (CVD) process comprising deposition of silicon and/or silicon/composite and/or silicon alloy and/or silicon compound having at least one silicon atom materials on a substrate, reinforcing deposited layers without changing the chemical behavior of a surface of interest and forming members for various applications.

346. The process of claim 345, wherein the deposition of the silicon/silicon alloy/composite/silicon compound having at least one silicon atom material on the substrate comprises providing a suitable substrate having a sticking coefficient to deposited material.

347. The process of claim 46, wherein the material is selected from a group consisting of silicon nitrides, graphite, metal silicates, ceramics, silicon, silicon compound having at least one silicon atom, and substances suitable as substrate for particular applications, and combinations thereof.

348. The process of any of the preceding claims 345 to 347, wherein the deposition comprises depositing the material at variable temperatures of the substrate and variable pressures during the deposition process.

349. The process of any of the preceding claims 345 to 348, wherein the deposited layers have initial thicknesses that after sintering results in very dense material having

desired thickness for a particular application.

350. The process of any of the preceding claims 345 to 349, wherein the members are silicon/silicon alloy/composite/silicon compound having at least one silicon atom members having shapes selected from a group consisting of rod, tube having desired cross-section, shape and size, plate or any wafer processing chamber suitable type shape, having one or more gates leading inside the chamber.

351. Fabrication process for forming members comprising mixing a powder with a high purity liquid chemical compound and forming a slurry, spraying or casting the slurry, and forming a desired body.

352. The process of claim 351, wherein the spraying comprises depositing the slurry on a substrate that rotates and/or translates.

353. The process of claim 352, wherein the substrate comprises any material that does not react with or contaminate the slurry.

354. The process of claim 353, further comprising either incorporating the material in the fabricated body or curing and removing liquids and separating the material during or after deposition of the slurry.

355. The process of any of the preceding claims 351 to 354, further comprising roughly machining the cured articles before a bake-out process is implemented.

356. The process of any of the preceding claims 351 to 355, further comprising implementing a bake out process and completely removing chemical substances such as binders and sintering the silicon/silicon alloy/composite powder/silicon compound having at least one silicon atom made member.

357. The process of any of the preceding claims 351 to 356, further comprising machining the members into desired shapes following the bake-out process.

358. The process of any of the preceding claims 351 to 357, wherein the slurry deposition and/or casting is

conducted in vacuum or controlled gas atmosphere chamber employing one or more heaters.

359. The process of any of the preceding claims 351 to 358, wherein the curing and sintering is conducted in the same or in a different chamber.

360. The process of any of the preceding claims 351 to 359, wherein the silicon/silicon alloy/composite/silicon compound having at least one silicon atom member have shapes of rod, round tube, rectangular tube, plate or any wafer processing chamber suitable type shape.

361. Fabrication process comprising casting to shape silicon/silicon alloy/composite/silicon compound comprising at least one silicon atom material or re-melting and casting solid silicon and forming various made parts.

362. The process of claim 361, further comprising providing a high purity mold made from easily removable material that does not react with silicon/silicon alloy/composite/silicon compound, filling the mold with shot, powder or small chunks of the material to be melted.

363. The process of claim 362, wherein the material for casting is melted in a separate container and transferred into the mold after melting.

364. The process of claim 363, further comprising removing oxygen, nitrogen, water vapor, and other contaminants before the melting process.

365. The process of claim 364, wherein the forming the member comprises forming silicon/silicon alloy/composite/silicon compound member having a shape selected from a group consisting of rod, round tube, tube or any other shape or form.

366. Fabrication process comprising gelcasting silicon/silicon alloy/composite/silicon compound having at least one silicon atom material and forming a body.

367. The process of claim 366, further comprising

converting the material in powder having desired grain size.

368. The process of claim 367, further comprising suspending the powder in a monomer solution which is polymerized in a mold to form a rigid polymer/solvent gel.

369. The process of any of the preceding claims 366 to 368, further comprising adding organic or inorganic substances to the powder/polymer binder, triggering a polymerization process.

370. The process of any of preceding claims 366 to 369, wherein the polymerization process is triggered at desired process conditions.

371. The process of any of the preceding claims 366 to 370, wherein the process comprises up to 10-20 weight % polymer.

372. The process of any of the preceding claims 366 to 371, wherein the percentage is as low as few weight percent and over 20 weight percent.

373. The process of any of the preceding claims 366 to 372, further comprising drying and removing a solvent portion after removing the fabricated part from the mold.

374. The process of any of the preceding claims 366 to 372, further comprising wherein the solution is aqueous or non-aqueous.

375. The process of claim 374, wherein the non-aqueous solution comprises 50-55 volume % of powder with balance being a dispersion solution.

376. The process of any of preceding claims 366 to 375, wherein the solution comprises about 10% dispersant such as Rohm & Haas Triton X-100, or N-100 Dupont dibasic ester (DBE) or ICI Americas Solsperse 2000 in dibutil phtalate (DBP) and 90 % gelcasting premix, wherein the premix includes 10-30 volume % of monomers such as trifunctional trimethilpropane triacrylate (TMPTA) and difunctional 1,6 hexanediol diacrilate (HDODA) from Hoechst Celanese, 0.5 to 10 volume % of dybenzoil peroxide initiator with the rest being either

DBA, DBP or other suitable solvent.

377. The process of any of preceding claims 366 to 376, further comprising hardening of the material mass in the mold, spraying onto a substrate having desired process temperature, and fabricating the member,

378. The process of any of preceding claims 366 to 377, wherein the spraying comprises spraying in vacuum or desired gaseous atmosphere.

379. The process of any of the preceding claims 366 to 378, wherein the spraying comprises spraying the slurry or spraying various components onto the substrate, mixing, reacting and hardening into the desired shape.

380. The process of any of preceding claims 366 to 379, wherein the fabrication comprises continuous feeding onto a beltline type apparatus.

381. The process of any of preceding claims 366 to 380, further comprising hardening, drying and sintering as part of the continuous process.

382. The process of any of the preceding claims 366 to 381, wherein the feed comprises already made mixture of the material.

383. The process of any of the preceding claims 366 to 382, wherein the feed comprises mixing material at a feeding point.

384. Fabrication process for fabricating large size silicon/silicon alloys/composites/silicon compound having at least one silicon atom material into a member by directional solidification in an open or closed mold/container containing the material to be solidified.

385. The process of claim 384, wherein the member fabricated is a plate, rod, tube or any other shape.

386. The process of claim 385, wherein the process is conducted in a vacuum or controlled atmosphere chamber.

387. The process of any of the preceding claims 384 to 386, further comprising removing oxygen, nitrogen, water

vapor, and other possible contaminants are taken before melting the material.

388. The process of any of the preceding claims 384 to 387, wherein the member made may has shapes selected from a group consisting of plate, rod, tube or any other shape or form.